BRUHATH BANGALORE MAHANAGARA PALIKE

Name of the Agency : **Technical Manager,** KRIDL, Bangalore.

Name of the Work : Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.

Estimate Cost : Rs.

QUALITY CONTROL REPORTS TO

Asst. Executive Engineer,
Shettyhalli Sub Division,
BBMP, Bangalore.

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QUALITY CONTROL REPORTS FOR

GRANUALAR SUB BASE (GSB)

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Job No.: CTCE/BBMP/W.No.12/KRIDL/GSB-1/GR/2015-16 Date : 09.09.2015

GRADATION FOR GSB-I (CLOSE GRADED)
IS: 2720 (Part 4)

Customer : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of work : Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.

Date of Testing : 09.09.2015

Sample Source : GSB Mix Plant Bangalore. **Oven Dry Wt (gm) :** 9465

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Specified Limits
75.0	0	0	0.00	0	100
53.0	595	595	6.29	93.71	80-100
26.50	2250	2845	30.06	69.94	55-90
9.50	1050	3895	41.15	58.85	35-65
4.75	1160	5055	53.41	46.59	25-55
2.36	925	5980	63.18	36.82	20-40
0.425	1785	7765	82.04	17.96	10-25
0.075	950	8715	92.08	7.92	3-10
PAN	750				
Total	9465				

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Remarks: Satisfies MORTH Specifications as per Table 400-1, Grading I

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Job No.: CTCE/BBMP/W.No.12/KRIDL/GSB-1/AL/2015-16 Date : 09.09.2015

ATTERBERG LIMITS TEST FOR GSB (CLOSE GRADED)
IS : 2720 (Part - 5)

Customer : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of work : Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.

Date of Testing : 09.09.2015

As per MORTH Table : 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	23.00	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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QUALITY CONTROL REPORTS FOR

WE MIX MACADAM(WMM)

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Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/Gradation/2015-16

18.09.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.

Date of Testing : 18.09.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 8705

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	315	315	3.6	96.4	95-100
22.4	2580	2895	33.3	66.7	60-80
11.2	1265	4160	47.8	52.2	40-60
4.75	1265	5425	62.3	37.7	25-40
2.36	985	6410	73.6	26.4	15-30
0.600	950	7360	84.5	15.5	8-22
0.075	855	8215	94.4	5.6	0-8

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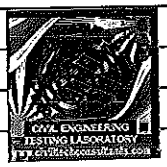
Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/AIV/2015-16

18.09.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	18.09.2015



Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	386.5	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	301.5	
4	Aggregate Impact value = percent fines	22.94	21.99	
	100* (W_2/W_1)%			22.47

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.70/GNR/WMM/S-T/2015-16 21.09.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Hegganahalli Sub Division, BBMP, Bangalore.
Agency	**Mr. G.N. Ramesh,** No.01, 3rd Main, Gandhi Grama, 7th Cross, Maruthi Layout, Bangalore – 560021.
Name of Work	Improvements and asphalting to cross roads between Vedha Garments and Konika Garments in Ward No.70, BBMP, Bangalore.
Reference	EE/DD/WO/358/2014-15 Dated: 31.03.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	21.09.2015

Result : Flakiness Index = **12.52%**

Elongation Index = **13.69%**

Result : Combined Flakiness & Elongation index **26.21%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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QUALITY CONTROL REPORTS FOR

BITUMINOUS CONCRETE

CIVIL-TECH CONSULTANTS AND ENGINEERS

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T-2377

Job No.: CTCE/BBMP/W.No.12/KRIDL/CSR.10/971e/QB(BC)/2015-16 13.10.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

* CUSTOMER	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Technical Manager,** KRIDL, Bangalore.
*NAME OF THE WORK	:	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
*SAMPLE ID	:	Hot mix Plant, Bangalore
DATE OF SAMPLING	:	12.10.2015
DATE OF TESTING	:	13.10.2015

The results of the tests conducted on the bitumen sample for Bituminous Concrete are as follows:

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	68	60 to 70
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	51	Min. 45
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 50
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	294	Min. 220

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/AIV/2015-16

14.10.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.10.2015

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	299	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.37	22.34	22.35

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Shape.T/2015-16 : 14.10.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 14.10.2015

Result : Flakiness Index = **11.96%**

Elongation Index = **13.52%**

Result : Combined Flakiness & Elongation index **25.48%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Dense Graded Bituminous Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Stripping/2015-16

16.10.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Type of Mix	Bituminous Concrete
Date of Testing	16.10.2015

Type of binder : 60/70

Percentage of binder used : 5.00% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.00 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Sp_Wa/2015-16

16.10.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Type of Mix	Bituminous Concrete
Date of Testing	16.10.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	1995	1996	1997	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1242	
4	Weight of saturated surface dry aggregate in air	W_3 g	2020	2022	2021	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	781	784	779	
6	Weight of oven dried aggregate	W_4 g	2003	2004	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.565	2.556	2.574	2.565
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.622	2.616	2.628	2.622
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.85%	0.90%	0.80%	0.85%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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JobNo: CTCE/BBMP/W.No.12/KRIDL/BC/Bitumen/2015-16 16.10.2015

BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

As per IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
SAMPLE I/D	Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12
DATE OF TESTING	16.10.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	27.00
7. Bitumen content in %	5.20	5.40
8. Average	**5.30**	

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JobNo: CTCE/BBMP/W.No.12/KRIDL/BC/Bitumen/2015-16 16.10.2015

BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

As Per IS 2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
SAMPLE I/D	Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12
DATE OF TESTING	16.10.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	45.23	9.54	9.54	90.46	79-100
9.5	39.68	8.37	17.91	82.09	70-88
4.75	62.35	13.15	31.07	68.93	53-71
2.36	62.35	13.15	44.22	55.78	42-58
1.18	53.36	11.26	55.48	44.52	34-48
0.6	56.69	11.96	67.44	32.56	26-38
0.3	45.69	9.64	77.08	22.92	18-28
0.15	38.26	8.07	85.15	14.85	12-20
0.075	38.65	8.15	93.30	6.70	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	33.36	7.05	7.05	92.95	79-100
9.5	45.25	9.57	16.62	83.38	70-88
4.75	73.25	15.49	32.11	67.89	53-71
2.36	66.38	14.03	46.14	53.86	42-58
1.18	70.21	14.84	60.98	39.02	34-48
0.6	45.65	9.65	70.63	29.37	26-38
0.3	35.64	7.53	78.17	21.83	18-28
0.15	35.21	7.44	85.61	14.39	12-20
0.075	32.65	6.90	92.52	7.48	4-10

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Agg/2015-16 16.10.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of theWork	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	16.10.2015

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	635	11.87	11.87	88.13	79 - 100	
9.5	475	8.88	20.75	79.25	70 - 88	
4.75	625	11.68	32.43	67.57	53 - 71	
2.36	530	9.91	42.34	57.66	42 - 58	
1.18	640	11.96	54.30	45.70	34 - 48	
0.600	510	9.53	63.83	36.17	26 - 38	
0.300	555	10.37	74.21	25.79	18 - 28	
0.150	445	8.32	82.52	17.48	12 - 20	
0.075	535	10.00	92.52	7.48	4 - 10	

Total Weight of Sample: **5400** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	625	11.57	11.57	88.43	79 - 100	
9.5	495	9.17	20.74	79.26	70 - 88	
4.75	755	13.98	34.72	65.28	53 - 71	
2.36	550	10.19	44.91	55.09	42 - 58	
1.18	650	12.04	56.94	43.06	34 - 48	
0.600	595	11.02	67.96	32.04	26 - 38	
0.300	495	9.17	77.13	22.87	18 - 28	
0.150	515	9.54	86.67	13.33	12 - 20	
0.075	425	7.87	94.54	5.46	4 - 10	

Note:

⇒ This test report should not be reproduced except in full, without written approval of the laboratory.

⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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Job No.: CTCE/BBMP/W.No.12/KRIDL/BC/Stability/2015-16 16.10.2015

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager,** KRIDL, Bangalore.
Name of Project	:	Improvements to Main and Cross Roads in Chowdappa Layuot and Durgaparameshwari Temple area at Medarahalli in Ward No.12 in Shettyhalli Sub Division, BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	16.10.2014

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.55	9.45	9 Kn (min)
2	Marshal flow, mm	3.10	3.25	2 – 4
3	Percent air voids in Mineral Aggregate	13.70	13.95	13 – 15
4	Voids in Compacted Mix	4.35	4.40	3 – 6
5	Percent Voids filled with Bitumen	71.70	72.65	65 - 75
6	Density, g/cc	2.27	2.26	--

Note:

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AE-12
16/10

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